



## SEQUENCE LISTING

<110> KATO, MASARU  
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IWAMATSU, AKIHIRO  
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KOMEDA, TOSHIHIRO

<120> NOVEL TRANSFERASE AND AMYLASE, PROCESS FOR PRODUCING  
THE ENZYMES, USE THEREOF, AND GENE CODING FOR THE SAME

<130> 049441/0124

<140> 09/695,423

<141> 2000-10-25

<150> 09/298,924

<151> 1999-04-26

<150> 08/750,569

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<151> 1995-06-14

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<151> 1994-10-31

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<151> 1994-08-18

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<170> PatentIn Ver. 2.1

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JAN 30 2003

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Tyr Lys Gly Leu Asp Leu Glu Glu Gly Leu Cys Gly Phe Ile Arg Phe	
615 620 625 630	
aac aaa att ttg gta ata ata aaa acc aag gga agt gtt aat tac aaa	2753
Asn Lys Ile Leu Val Ile Ile Lys Thr Lys Gly Ser Val Asn Tyr Lys	
635 640 645	
ctg aaa ctt gaa gag gga gca att tac aca gat gta ttg aca gga gaa	2801
Leu Lys Leu Glu Glu Gly Ala Ile Tyr Thr Asp Val Leu Thr Gly Glu	
650 655 660	
gaa att aaa aaa gag gta cag att aat gag cta cct agg ata cta gtt	2849
Glu Ile Lys Lys Glu Val Gln Ile Asn Glu Leu Pro Arg Ile Leu Val	
665 670 675	
aga atg taagttataa taatccgatt tttatgtgac aagatttacg cttacgaaaa	2905
Arg Met	
680	
ggactgttaa atcaactttt atgtgaatta tgaaacgtaa attataagtt tcctgaggat	2965
aaacatatat atctctatct ctcatgata tcacatgagt attagattaa ggggaagtaa	3025
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aataggaacg gacttagtct acaaatgcc taaatgtgaa aagaagtata acgcattctt	3145
ctgtgaagca gatgctaggg gattaaagaa aaagtgccca tactgtggta ctgaacttgt	3205

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 cacaatataa taagattgcc tatattgaca tggacataga aacgacagaa ttttaagatat 3385  
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 <213> Sulfolobus acidocaldarius

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 Asn His Met Ala Val Asn Ser Leu Asn Trp Arg Leu Met Asp Val Leu  
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 Lys Met Gly Lys Lys Ser Lys Tyr Tyr Thr Tyr Phe Asp Phe Phe Pro  
 65 70 75 80  
 Glu Asp Asp Lys Ile Arg Leu Pro Ile Leu Gly Glu Asp Leu Asp Thr  
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 Val Ile Ser Lys Gly Leu Leu Lys Ile Val Lys Asp Gly Asp Glu Tyr  
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 Phe Leu Glu Tyr Phe Lys Trp Lys Leu Pro Leu Thr Glu Val Gly Asn  
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 Asp Ile Tyr Asp Thr Leu Gln Lys Gln Asn Tyr Thr Leu Met Ser Trp  
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 Lys Asn Pro Pro Ser Tyr Arg Arg Phe Phe Asp Val Asn Thr Leu Ile  
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 Gly Val Asn Val Glu Lys Asp His Val Phe Gln Glu Ser His Ser Lys  
 165 170 175  
 Ile Leu Asp Leu Asp Val Asp Gly Tyr Arg Ile Asp His Ile Asp Gly  
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 Leu Tyr Asp Pro Glu Lys Tyr Ile Asn Asp Leu Arg Ser Ile Ile Lys  
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 Asn Lys Ile Ile Ile Val Glu Lys Ile Leu Gly Phe Gln Glu Glu Leu  
 210 215 220

Lys Leu Asn Ser Asp Gly Thr Thr Gly Tyr Asp Phe Leu Asn Tyr Ser  
 225 230 235 240  
 Asn Leu Leu Phe Asn Phe Asn Gln Glu Ile Met Asp Ser Ile Tyr Glu  
 245 250 255  
 Asn Phe Thr Ala Glu Lys Ile Ser Ile Ser Glu Ser Ile Lys Lys Ile  
 260 265 270  
 Lys Ala Gln Ile Ile Asp Glu Leu Phe Ser Tyr Glu Val Lys Arg Leu  
 275 280 285  
 Ala Ser Gln Leu Gly Ile Ser Tyr Asp Ile Leu Arg Asp Tyr Leu Ser  
 290 295 300  
 Cys Ile Asp Val Tyr Arg Thr Tyr Ala Asn Gln Ile Val Lys Glu Cys  
 305 310 315 320  
 Asp Lys Thr Asn Glu Ile Glu Glu Ala Thr Lys Arg Asn Pro Glu Ala  
 325 330 335  
 Tyr Thr Lys Leu Gln Gln Tyr Met Pro Ala Val Tyr Ala Lys Ala Tyr  
 340 345 350  
 Glu Asp Thr Phe Leu Phe Arg Tyr Asn Arg Leu Ile Ser Ile Asn Glu  
 355 360 365  
 Val Gly Ser Asp Leu Arg Tyr Tyr Lys Ile Ser Pro Asp Gln Phe His  
 370 375 380  
 Val Phe Asn Gln Lys Arg Arg Gly Lys Ile Thr Leu Asn Ala Thr Ser  
 385 390 395 400  
 Thr His Asp Thr Lys Phe Ser Glu Asp Val Arg Met Lys Ile Ser Val  
 405 410 415  
 Leu Ser Glu Phe Pro Glu Glu Trp Lys Asn Lys Val Glu Glu Trp His  
 420 425 430  
 Ser Ile Ile Asn Pro Lys Val Ser Arg Asn Asp Glu Tyr Arg Tyr Tyr  
 435 440 445  
 Gln Val Leu Val Gly Ser Phe Tyr Glu Gly Phe Ser Asn Asp Phe Lys  
 450 455 460  
 Glu Arg Ile Lys Gln His Met Ile Lys Ser Val Arg Glu Ala Lys Ile  
 465 470 475 480  
 Asn Thr Ser Trp Arg Asn Gln Asn Lys Glu Tyr Glu Asn Arg Val Met  
 485 490 495  
 Glu Leu Val Glu Glu Thr Phe Thr Asn Lys Asp Phe Ile Lys Ser Phe  
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 Met Lys Phe Glu Ser Lys Ile Arg Arg Ile Gly Met Ile Lys Ser Leu  
 515 520 525

Ser Leu Val Ala Leu Lys Ile Met Ser Ala Gly Ile Pro Asp Phe Tyr  
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 Gln Gly Thr Glu Ile Trp Arg Tyr Leu Leu Thr Asp Pro Asp Asn Arg  
 545 550 555 560  
 Val Pro Val Asp Phe Lys Lys Leu His Glu Ile Leu Glu Lys Ser Lys  
 565 570 575  
 Lys Phe Glu Lys Asn Met Leu Glu Ser Met Asp Asp Gly Arg Ile Lys  
 580 585 590  
 Met Tyr Leu Thr Tyr Lys Leu Leu Ser Leu Arg Lys Gln Leu Ala Glu  
 595 600 605  
 Asp Phe Leu Lys Gly Glu Tyr Lys Gly Leu Asp Leu Glu Glu Gly Leu  
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 Cys Gly Phe Ile Arg Phe Asn Lys Ile Leu Val Ile Ile Lys Thr Lys  
 625 630 635 640  
 Gly Ser Val Asn Tyr Lys Leu Lys Leu Glu Glu Gly Ala Ile Tyr Thr  
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 gcagaggtaa acccatgaat gtcattttcg acgtattaaa cgagatccat ggggttttttg 180  
 gtgcattgtg ggcgggagca gctctactta actacttagt taagcctcaa gataagaggc 240  
 aatttgagag aatagggaaa ttcttcatga taaactcagt cattacagta ataactggga 300  
 taataatttt cgcctacatt tacctagccc cttatcaagg gaattttattt ctagtagcgg 360  
 caattctacg ttcaagcctt gacattaggt taagggcctt actaaactta ataggaggag 420  
 cgtttggtt attggctttt ggggcaggga tagttataag caataggata aggcttatgg 480  
 tacgtgttaa ggaaggtgac gctacaatcc tagagttgag gaatagtatt gccaatattat 540

ctaaaattag tttaatcttc ttattacttt ccttagccat gatgatactt gctgggtcca 600

tagcacaagt tataagtttag agttgaaaga aaaattta atg acg ttt gct tat aaa 656  
Met Thr Phe Ala Tyr Lys  
1 5

ata gat gga aat gag gta atc ttt acc tta tgg gca cct tat caa aag 704  
Ile Asp Gly Asn Glu Val Ile Phe Thr Leu Trp Ala Pro Tyr Gln Lys  
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agc gtt aaa cta aag gtt cta gag aag gga ctt tac gaa atg gaa aga 752  
Ser Val Lys Leu Lys Val Leu Glu Lys Gly Leu Tyr Glu Met Glu Arg  
25 30 35

gat gaa aaa ggt tac ttc acc att acc tta aac aac gta aag gtt aga 800  
Asp Glu Lys Gly Tyr Phe Thr Ile Thr Leu Asn Asn Val Lys Val Arg  
40 45 50

gat agg tat aaa tac gtt tta gat gat gct agt gaa ata cca gat cca 848  
Asp Arg Tyr Lys Tyr Val Leu Asp Asp Ala Ser Glu Ile Pro Asp Pro  
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gca tcc aga tac caa cca gaa ggt gta cat ggg cct tca caa att ata 896  
Ala Ser Arg Tyr Gln Pro Glu Gly Val His Gly Pro Ser Gln Ile Ile  
75 80 85

caa gaa agt aaa gag ttc aac aac gag act ttt ctg aag aaa gag gac 944  
Gln Glu Ser Lys Glu Phe Asn Asn Glu Thr Phe Leu Lys Lys Glu Asp  
90 95 100

ttg ata att tat gaa ata cac gtg ggg act ttc act cca gag gga acg 992  
Leu Ile Ile Tyr Glu Ile His Val Gly Thr Phe Thr Pro Glu Gly Thr  
105 110 115

ttt gag gga gtg ata agg aaa ctt gac tac tta aag gat ttg gga att 1040  
Phe Glu Gly Val Ile Arg Lys Leu Asp Tyr Leu Lys Asp Leu Gly Ile  
120 125 130

acg gca ata gag ata atg cca ata gct caa ttt cct ggg aaa agg gat 1088  
Thr Ala Ile Glu Ile Met Pro Ile Ala Gln Phe Pro Gly Lys Arg Asp  
135 140 145 150

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Trp Gly Tyr Asp Gly Val Tyr Leu Tyr Ala Val Gln Asn Ser Tyr Gly  
155 160 165

ggg cca gaa ggt ttt aga aag tta gtt gat gaa gcg cac aag aaa ggt 1184  
Gly Pro Glu Gly Phe Arg Lys Leu Val Asp Glu Ala His Lys Lys Gly  
170 175 180

tta gga gtt att tta gac gta gta tac aac cac gtt gga cca gag gga 1232  
Leu Gly Val Ile Leu Asp Val Val Tyr Asn His Val Gly Pro Glu Gly  
185 190 195

aac tat atg gtt aaa ttg ggg cca tat ttc tca cag aaa tac aaa acg 1280  
Asn Tyr Met Val Lys Leu Gly Pro Tyr Phe Ser Gln Lys Tyr Lys Thr  
200 205 210

cca tgg gga tta acc ttt aac ttt gac gat gct gaa agc gat gag gtt	1328
Pro Trp Gly Leu Thr Phe Asn Phe Asp Asp Ala Glu Ser Asp Glu Val	
215 220 225 230	
agg aag ttc atc tta gaa aac gtt gag tac tgg att aag gaa tat aac	1376
Arg Lys Phe Ile Leu Glu Asn Val Glu Tyr Trp Ile Lys Glu Tyr Asn	
235 240 245	
gtt gat ggg ttt aga tta gat gcg gtt cat gca att att gac act tct	1424
Val Asp Gly Phe Arg Leu Asp Ala Val His Ala Ile Ile Asp Thr Ser	
250 255 260	
cct aag cac atc ttg gag gaa ata gct gac gtt gtg cat aag tat aat	1472
Pro Lys His Ile Leu Glu Glu Ile Ala Asp Val Val His Lys Tyr Asn	
265 270 275	
agg att gtc ata gcc gaa agt gat tta aac gat cct aga gtc gtt aat	1520
Arg Ile Val Ile Ala Glu Ser Asp Leu Asn Asp Pro Arg Val Val Asn	
280 285 290	
ccc aag gaa aag tgt gga tat aat att gat gct caa tgg gtt gac gat	1568
Pro Lys Glu Lys Cys Gly Tyr Asn Ile Asp Ala Gln Trp Val Asp Asp	
295 300 305 310	
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Phe His His Ser Ile His Ala Tyr Leu Thr Gly Glu Arg Gln Gly Tyr	
315 320 325	
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Tyr Thr Asp Phe Gly Asn Leu Asp Asp Ile Val Lys Ser Tyr Lys Asp	
330 335 340	
gtt ttc gta tat gat ggt aag tac tcc aat ttt aga aga aaa act cac	1712
Val Phe Val Tyr Asp Gly Lys Tyr Ser Asn Phe Arg Arg Lys Thr His	
345 350 355	
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Gly Glu Pro Val Gly Glu Leu Asp Gly Cys Asn Phe Val Val Tyr Ile	
360 365 370	
caa aat cac gat caa gtc gga aat aga ggc aaa ggt gaa aga ata att	1808
Gln Asn His Asp Gln Val Gly Asn Arg Gly Lys Gly Glu Arg Ile Ile	
375 380 385 390	
aaa tta gtc gat agg gaa agc tac aag atc gct gca gcc ctt tac ctt	1856
Lys Leu Val Asp Arg Glu Ser Tyr Lys Ile Ala Ala Ala Leu Tyr Leu	
395 400 405	
ctt tcc ccc tat att cca atg att ttc atg gga gag gaa tac ggt gag	1904
Leu Ser Pro Tyr Ile Pro Met Ile Phe Met Gly Glu Glu Tyr Gly Glu	
410 415 420	
gaa aat ccc ttt tat ttc ttt tct gat ttt tca gat tca aaa ctg ata	1952
Glu Asn Pro Phe Tyr Phe Phe Ser Asp Phe Ser Asp Ser Lys Leu Ile	
425 430 435	



caa ggt gta agg gaa ggg aga aaa aag gaa aac ggg caa gat act gac 2000  
 Gln Gly Val Arg Glu Gly Arg Lys Lys Glu Asn Gly Gln Asp Thr Asp  
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cct caa gat gaa tca act ttt aac gct tcc aaa ctg agt tgg aag att 2048  
 Pro Gln Asp Glu Ser Thr Phe Asn Ala Ser Lys Leu Ser Trp Lys Ile  
 455 460 465 470

gac gag gaa atc ttt tca ttt tac aag att tta ata aaa atg aga aag 2096  
 Asp Glu Glu Ile Phe Ser Phe Tyr Lys Ile Leu Ile Lys Met Arg Lys  
 475 480 485

gag ttg agc ata gcg tgt gat agg aga gta aac gtc gtg aat ggc gaa 2144  
 Glu Leu Ser Ile Ala Cys Asp Arg Arg Val Asn Val Val Asn Gly Glu  
 490 495 500

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 Asn Trp Leu Ile Ile Lys Gly Arg Glu Tyr Phe Ser Leu Tyr Val Phe  
 505 510 515

tct aaa tca tct att gaa gtt aag tac agt gga act tta ctt ttg tcc 2240  
 Ser Lys Ser Ser Ile Glu Val Lys Tyr Ser Gly Thr Leu Leu Leu Ser  
 520 525 530

tca aat aat tca ttc cct cag cat att gaa gaa ggt aaa tat gag ttt 2288  
 Ser Asn Asn Ser Phe Pro Gln His Ile Glu Glu Gly Lys Tyr Glu Phe  
 535 540 545 550

gat aag gga ttt gct tta tat aaa ctt taggacagga gagtttaaaa 2335  
 Asp Lys Gly Phe Ala Leu Tyr Lys Leu  
 555

atttctatga atgattatac tttagatgat gagtaaaagc aagatcgatg aggaagagaa 2395

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ttttaaactc aaataataat aaataccatc atgtcaatat tcttcagaac tagagataga 2515

cctttacgtc ccggagatcc gtatccatta ggttcaaatt ggatagaaga tgaggatggc 2575

gtaaattttt ccttgttctc agagaatgca gacaaagtgg agttgattct ttattcacaa 2635

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Tyr Glu Met Glu Arg Asp Glu Lys Gly Tyr Phe Thr Ile Thr Leu Asn  
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 Asn Val Lys Val Arg Asp Arg Tyr Lys Tyr Val Leu Asp Asp Ala Ser  
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 Glu Ile Pro Asp Pro Ala Ser Arg Tyr Gln Pro Glu Gly Val His Gly  
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 Pro Ser Gln Ile Ile Gln Glu Ser Lys Glu Phe Asn Asn Glu Thr Phe  
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 Leu Lys Lys Glu Asp Leu Ile Ile Tyr Glu Ile His Val Gly Thr Phe  
    100   105   110  
 Thr Pro Glu Gly Thr Phe Glu Gly Val Ile Arg Lys Leu Asp Tyr Leu  
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 Lys Asp Leu Gly Ile Thr Ala Ile Glu Ile Met Pro Ile Ala Gln Phe  
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 Pro Gly Lys Arg Asp Trp Gly Tyr Asp Gly Val Tyr Leu Tyr Ala Val  
  145   150   155   160  
 Gln Asn Ser Tyr Gly Gly Pro Glu Gly Phe Arg Lys Leu Val Asp Glu  
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 Ala His Lys Lys Gly Leu Gly Val Ile Leu Asp Val Val Tyr Asn His  
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 Val Gly Pro Glu Gly Asn Tyr Met Val Lys Leu Gly Pro Tyr Phe Ser  
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 Gln Lys Tyr Lys Thr Pro Trp Gly Leu Thr Phe Asn Phe Asp Asp Ala  
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 Glu Ser Asp Glu Val Arg Lys Phe Ile Leu Glu Asn Val Glu Tyr Trp  
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 Ile Ile Asp Thr Ser Pro Lys His Ile Leu Glu Glu Ile Ala Asp Val  
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 Val His Lys Tyr Asn Arg Ile Val Ile Ala Glu Ser Asp Leu Asn Asp  
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 Pro Arg Val Val Asn Pro Lys Glu Lys Cys Gly Tyr Asn Ile Asp Ala  
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 Gln Trp Val Asp Asp Phe His His Ser Ile His Ala Tyr Leu Thr Gly  
  305   310   315   320  
 Glu Arg Gln Gly Tyr Tyr Thr Asp Phe Gly Asn Leu Asp Asp Ile Val  
    325   330   335

Lys Ser Tyr Lys Asp Val Phe Val Tyr Asp Gly Lys Tyr Ser Asn Phe  
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 355 360 365  
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 370 375 380  
 Gly Glu Arg Ile Ile Lys Leu Val Asp Arg Glu Ser Tyr Lys Ile Ala  
 385 390 395 400  
 Ala Ala Leu Tyr Leu Leu Ser Pro Tyr Ile Pro Met Ile Phe Met Gly  
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 Glu Glu Tyr Gly Glu Glu Asn Pro Phe Tyr Phe Phe Ser Asp Phe Ser  
 420 425 430  
 Asp Ser Lys Leu Ile Gln Gly Val Arg Glu Gly Arg Lys Lys Glu Asn  
 435 440 445  
 Gly Gln Asp Thr Asp Pro Gln Asp Glu Ser Thr Phe Asn Ala Ser Lys  
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 Leu Ser Trp Lys Ile Asp Glu Glu Ile Phe Ser Phe Tyr Lys Ile Leu  
 465 470 475 480  
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 485 490 495  
 Val Val Asn Gly Glu Asn Trp Leu Ile Ile Lys Gly Arg Glu Tyr Phe  
 500 505 510  
 Ser Leu Tyr Val Phe Ser Lys Ser Ser Ile Glu Val Lys Tyr Ser Gly  
 515 520 525  
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<212> DNA

<213> *Sulfolobus acidocaldarius*

<220>

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<222> (1176)..(2843)

<400> 7

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gacgaaatgt gaaagacata gaacactttc tttggccctc tagtccagtt gagcgtgtat 300  
acgtagaagc cgtcctcttt cactgtgttc ttctcgtcat actcattgag aacctttaca 360  
gcctccctaa gccttatacc gctctcaagg aggagcttga agactagctc tacctcaata 420  
cctctaacag cctccaacca cctccctatc tcgtcagctc ctggaacctt aagatcaaca 480  
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taaatatatt aagacataat ttctatttaa acagc atg ttt tcg ttc ggt gga 1193  
Met Phe Ser Phe Gly Gly  
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aat att gaa aaa aat aaa ggt atc ttt aag tta tgg gca cct tat gtt 1241  
Asn Ile Glu Lys Asn Lys Gly Ile Phe Lys Leu Trp Ala Pro Tyr Val  
10 15 20

aat agt gtt aag ctg aag tta agc aaa aaa ctt att cca atg gaa aaa 1289  
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25 30 35

aac gat gag gga ttt ttc gaa gta gaa ata gac gat atc gag gaa aat 1337  
Asn Asp Glu Gly Phe Phe Glu Val Glu Ile Asp Asp Ile Glu Glu Asn  
40 45 50

tta acc tat tct tat att ata gaa gat aag aga gag ata cct gat ccc 1385  
Leu Thr Tyr Ser Tyr Ile Ile Glu Asp Lys Arg Glu Ile Pro Asp Pro  
55 60 65 70

gca tca cga tat caa cct tta gga gtt cat gac aaa tca caa ctt ata 1433  
Ala Ser Arg Tyr Gln Pro Leu Gly Val His Asp Lys Ser Gln Leu Ile  
75 80 85

aga aca gat tat cag att ctt gac ctt gga aaa gta aaa ata gaa gat	1481
Arg Thr Asp Tyr Gln Ile Leu Asp Leu Gly Lys Val Lys Ile Glu Asp	
90 95 100	
cta ata ata tat gaa ctc cac gtt ggt act ttt tcc caa gaa gga aat	1529
Leu Ile Ile Tyr Glu Leu His Val Gly Thr Phe Ser Gln Glu Gly Asn	
105 110 115	
ttc aaa gga gta ata gaa aag tta gat tac ctc aag gat cta gga atc	1577
Phe Lys Gly Val Ile Glu Lys Leu Asp Tyr Leu Lys Asp Leu Gly Ile	
120 125 130	
aca gga att gaa ctg atg cct gtg gca caa ttt cca ggg aat aga gat	1625
Thr Gly Ile Glu Leu Met Pro Val Ala Gln Phe Pro Gly Asn Arg Asp	
135 140 145 150	
tgg gga tac gat ggt gtt ttt cta tac gca gtt caa aat act tat ggc	1673
Trp Gly Tyr Asp Gly Val Phe Leu Tyr Ala Val Gln Asn Thr Tyr Gly	
155 160 165	
gga cca tgg gaa ttg gct aag cta gta aac gag gca cat aaa agg gga	1721
Gly Pro Trp Glu Leu Ala Lys Leu Val Asn Glu Ala His Lys Arg Gly	
170 175 180	
ata gcc gta att ttg gat gtt gta tat aat cat ata ggt cct gag gga	1769
Ile Ala Val Ile Leu Asp Val Val Tyr Asn His Ile Gly Pro Glu Gly	
185 190 195	
aat tac ctt tta gga tta ggt cct tat ttt tca gac aga tat aaa act	1817
Asn Tyr Leu Leu Gly Leu Gly Pro Tyr Phe Ser Asp Arg Tyr Lys Thr	
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Pro Trp Gly Leu Thr Phe Asn Phe Asp Asp Arg Gly Cys Asp Gln Val	
215 220 225 230	
aga aaa ttc att tta gaa aat gtc gag tat tgg ttt aag acc ttt aaa	1913
Arg Lys Phe Ile Leu Glu Asn Val Glu Tyr Trp Phe Lys Thr Phe Lys	
235 240 245	
atc gat ggt ctg aga ctg gat gca gtt cat gca att ttt gat aat tcg	1961
Ile Asp Gly Leu Arg Leu Asp Ala Val His Ala Ile Phe Asp Asn Ser	
250 255 260	
cct aag cat atc ctc caa gag ata gct gaa aaa gcc cat caa tta gga	2009
Pro Lys His Ile Leu Gln Glu Ile Ala Glu Lys Ala His Gln Leu Gly	
265 270 275	
aaa ttt gtt att gct gaa agt gat tta aat gat cca aaa ata gta aaa	2057
Lys Phe Val Ile Ala Glu Ser Asp Leu Asn Asp Pro Lys Ile Val Lys	
280 285 290	
gat gat tgt gga tat aaa ata gat gct caa tgg gtt gac gat ttc cac	2105
Asp Asp Cys Gly Tyr Lys Ile Asp Ala Gln Trp Val Asp Asp Phe His	
295 300 305 310	

cac gca gtt cat gca ttc ata aca aaa gaa aaa gat tat tat tac cag	2153
His Ala Val His Ala Phe Ile Thr Lys Glu Lys Asp Tyr Tyr Tyr Gln	
315 320 325	
gat ttt gga agg ata gaa gat ata gag aaa act ttt aaa gat gtt ttt	2201
Asp Phe Gly Arg Ile Glu Asp Ile Glu Lys Thr Phe Lys Asp Val Phe	
330 335 340	
gtt tat gat gga aag tat tct aga tac aga gga aga act cat ggt gct	2249
Val Tyr Asp Gly Lys Tyr Ser Arg Tyr Arg Gly Arg Thr His Gly Ala	
345 350 355	
cct gta ggt gat ctt cca cca cgt aaa ttt gta gtc ttc ata caa aat	2297
Pro Val Gly Asp Leu Pro Pro Arg Lys Phe Val Val Phe Ile Gln Asn	
360 365 370	
cac gat caa gta gga aat aga gga aat ggg gaa aga ctt tcc ata tta	2345
His Asp Gln Val Gly Asn Arg Gly Asn Gly Glu Arg Leu Ser Ile Leu	
375 380 385 390	
acc gat aaa acg aca tac ctt atg gca gcc aca cta tat ata ctc tca	2393
Thr Asp Lys Thr Thr Tyr Leu Met Ala Ala Thr Leu Tyr Ile Leu Ser	
395 400 405	
ccg tat ata ccg cta ata ttt atg ggc gag gaa tat tat gag acg aat	2441
Pro Tyr Ile Pro Leu Ile Phe Met Gly Glu Glu Tyr Tyr Glu Thr Asn	
410 415 420	
cct ttt ttc ttc ttc tct gat ttc tca gat ccc gta tta att aag ggt	2489
Pro Phe Phe Phe Phe Ser Asp Phe Ser Asp Pro Val Leu Ile Lys Gly	
425 430 435	
gtt aga gaa ggt aga cta aag gaa aat aat caa atg ata gat cca caa	2537
Val Arg Glu Gly Arg Leu Lys Glu Asn Asn Gln Met Ile Asp Pro Gln	
440 445 450	
tct gag gaa gcg ttc tta aag agt aaa ctt tca tgg aaa att gat gag	2585
Ser Glu Glu Ala Phe Leu Lys Ser Lys Leu Ser Trp Lys Ile Asp Glu	
455 460 465 470	
gaa gtt tta gat tat tat aaa caa ctg ata aat atc aga aag aga tat	2633
Glu Val Leu Asp Tyr Tyr Lys Gln Leu Ile Asn Ile Arg Lys Arg Tyr	
475 480 485	
aat aat tgt aaa agg gta aag gaa gtt agg aga gaa ggg aac tgt att	2681
Asn Asn Cys Lys Arg Val Lys Glu Val Arg Arg Glu Gly Asn Cys Ile	
490 495 500	
act ttg atc atg gaa aaa ata gga ata att gca tcg ttt gat gat att	2729
Thr Leu Ile Met Glu Lys Ile Gly Ile Ile Ala Ser Phe Asp Asp Ile	
505 510 515	
gta att aat tct aaa att aca ggt aat tta ctt ata ggc ata gga ttt	2777
Val Ile Asn Ser Lys Ile Thr Gly Asn Leu Leu Ile Gly Ile Gly Phe	
520 525 530	

ccg aaa aaa ttg aaa aaa gat gaa tta att aag gtt aac aga ggt gtt 2825  
 Pro Lys Lys Leu Lys Lys Asp Glu Leu Ile Lys Val Asn Arg Gly Val  
 535 540 545 550

ggg gta tat caa tta gaa tgaaagatcg accattaaag cctggtgaac 2873  
 Gly Val Tyr Gln Leu Glu  
 555

cttatccttt aggggcaact tggatagagg aagaagatgg agttaatttt gtactattct 2933  
 ctgagaacgc cacaaaagta gaactgtaa cgtactctca gactagacaa gatgagccaa 2993  
 aggaaataat agaacttaga cagagaaccg gagatctctg gcatgttttt gtacctggtt 3053  
 taagaccagg tcagttgtat gggtagagg tgtatgggcc atataaacca gaggaagggt 3113  
 taaggtttaa tcctaataaa gtactgatag atccttatgc aaaagctata aacggattat 3173  
 tactatggga tgattcgggc tttggatata aaattggaga tcagaaccag gatctcagtt 3233  
 tcgatgagag aaaagacgat aaatttatac ctaaaggggt cataataaat ccttattttg 3293  
 attgggagga cgagcatttc ttctttagaa gaaagatacc ttttaaggat agtataattt 3353  
 atgagacaca tataaaagga ataactaaat taaggcaaga tttaccggag aacgtagag 3413  
 gcactttttt ggggttagca tcagatacta tgattgatta cctaaaagat ttaggaatta 3473  
 caaccgttga gataatgcct attcagcaat ttgtagatga gagattcatt gtcgataaag 3533  
 ggtaaagaa ctactggggg tacaatccga taaattattt ctctcctgaa tgtagatact 3593  
 caagctc 3600

<210> 8  
 <211> 556  
 <212> PRT  
 <213> Sulfolobus acidocaldarius

<400> 8  
 Met Phe Ser Phe Gly Gly Asn Ile Glu Lys Asn Lys Gly Ile Phe Lys  
 1 5 10 15  
 Leu Trp Ala Pro Tyr Val Asn Ser Val Lys Leu Lys Leu Ser Lys Lys  
 20 25 30  
 Leu Ile Pro Met Glu Lys Asn Asp Glu Gly Phe Phe Glu Val Glu Ile  
 35 40 45  
 Asp Asp Ile Glu Glu Asn Leu Thr Tyr Ser Tyr Ile Ile Glu Asp Lys  
 50 55 60  
 Arg Glu Ile Pro Asp Pro Ala Ser Arg Tyr Gln Pro Leu Gly Val His  
 65 70 75 80  
 Asp Lys Ser Gln Leu Ile Arg Thr Asp Tyr Gln Ile Leu Asp Leu Gly  
 85 90 95

Lys Val Lys Ile Glu Asp Leu Ile Ile Tyr Glu Leu His Val Gly Thr  
 100 105 110  
 Phe Ser Gln Glu Gly Asn Phe Lys Gly Val Ile Glu Lys Leu Asp Tyr  
 115 120 125  
 Leu Lys Asp Leu Gly Ile Thr Gly Ile Glu Leu Met Pro Val Ala Gln  
 130 135 140  
 Phe Pro Gly Asn Arg Asp Trp Gly Tyr Asp Gly Val Phe Leu Tyr Ala  
 145 150 155 160  
 Val Gln Asn Thr Tyr Gly Gly Pro Trp Glu Leu Ala Lys Leu Val Asn  
 165 170 175  
 Glu Ala His Lys Arg Gly Ile Ala Val Ile Leu Asp Val Val Tyr Asn  
 180 185 190  
 His Ile Gly Pro Glu Gly Asn Tyr Leu Leu Gly Leu Gly Pro Tyr Phe  
 195 200 205  
 Ser Asp Arg Tyr Lys Thr Pro Trp Gly Leu Thr Phe Asn Phe Asp Asp  
 210 215 220  
 Arg Gly Cys Asp Gln Val Arg Lys Phe Ile Leu Glu Asn Val Glu Tyr  
 225 230 235 240  
 Trp Phe Lys Thr Phe Lys Ile Asp Gly Leu Arg Leu Asp Ala Val His  
 245 250 255  
 Ala Ile Phe Asp Asn Ser Pro Lys His Ile Leu Gln Glu Ile Ala Glu  
 260 265 270  
 Lys Ala His Gln Leu Gly Lys Phe Val Ile Ala Glu Ser Asp Leu Asn  
 275 280 285  
 Asp Pro Lys Ile Val Lys Asp Asp Cys Gly Tyr Lys Ile Asp Ala Gln  
 290 295 300  
 Trp Val Asp Asp Phe His His Ala Val His Ala Phe Ile Thr Lys Glu  
 305 310 315 320  
 Lys Asp Tyr Tyr Tyr Gln Asp Phe Gly Arg Ile Glu Asp Ile Glu Lys  
 325 330 335  
 Thr Phe Lys Asp Val Phe Val Tyr Asp Gly Lys Tyr Ser Arg Tyr Arg  
 340 345 350  
 Gly Arg Thr His Gly Ala Pro Val Gly Asp Leu Pro Pro Arg Lys Phe  
 355 360 365  
 Val Val Phe Ile Gln Asn His Asp Gln Val Gly Asn Arg Gly Asn Gly  
 370 375 380  
 Glu Arg Leu Ser Ile Leu Thr Asp Lys Thr Thr Tyr Leu Met Ala Ala  
 385 390 395 400



Thr Leu Tyr Ile Leu Ser Pro Tyr Ile Pro Leu Ile Phe Met Gly Glu  
 405 410 415  
 Glu Tyr Tyr Glu Thr Asn Pro Phe Phe Phe Phe Ser Asp Phe Ser Asp  
 420 425 430  
 Pro Val Leu Ile Lys Gly Val Arg Glu Gly Arg Leu Lys Glu Asn Asn  
 435 440 445  
 Gln Met Ile Asp Pro Gln Ser Glu Glu Ala Phe Leu Lys Ser Lys Leu  
 450 455 460  
 Ser Trp Lys Ile Asp Glu Glu Val Leu Asp Tyr Tyr Lys Gln Leu Ile  
 465 470 475 480  
 Asn Ile Arg Lys Arg Tyr Asn Asn Cys Lys Arg Val Lys Glu Val Arg  
 485 490 495  
 Arg Glu Gly Asn Cys Ile Thr Leu Ile Met Glu Lys Ile Gly Ile Ile  
 500 505 510  
 Ala Ser Phe Asp Asp Ile Val Ile Asn Ser Lys Ile Thr Gly Asn Leu  
 515 520 525  
 Leu Ile Gly Ile Gly Phe Pro Lys Lys Leu Lys Lys Asp Glu Leu Ile  
 530 535 540  
 Lys Val Asn Arg Gly Val Gly Val Tyr Gln Leu Glu  
 545 550 555

<210> 9  
 <211> 6  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 9  
 Val Ile Arg Glu Ala Lys  
 1 5

<210> 10  
 <211> 6  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 10  
 Ile Ser Ile Arg Gln Lys  
 1 5

<210> 11  
 <211> 5  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 11  
 Ile Ile Tyr Val Glu  
   1                  5

<210> 12  
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 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 12  
 Met Leu Tyr Val Lys  
   1                  5

<210> 13  
 <211> 7  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 13  
 Ile Leu Ser Ile Asn Glu Lys  
   1                  5

<210> 14  
 <211> 7  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 14  
 Val Val Ile Leu Thr Glu Lys  
   1                  5

<210> 15  
 <211> 10  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 15  
 Asn Leu Glu Leu Ser Asp Pro Arg Val Lys  
   1                  5                  10

<210> 16  
 <211> 12  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 16  
 Met Ile Ile Gly Thr Tyr Arg Leu Gln Leu Asn Lys  
   1                  5                  10

<210> 17  
 <211> 9

<212> PRT  
 <213> Sulfolobus solfataricus

<400> 17  
 Val Ala Val Leu Phe Ser Pro Ile Val  
       1                  5

<210> 18  
 <211> 11  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 18  
 Ile Asn Ile Asp Glu Leu Ile Ile Gln Ser Lys  
       1                  5                  10

<210> 19  
 <211> 12  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 19  
 Glu Leu Gly Val Ser His Leu Tyr Leu Ser Pro Ile  
       1                  5                  10

<210> 20  
 <211> 7  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 20  
 Asp Glu Val Phe Arg Glu Ser  
       1                  5

<210> 21  
 <211> 4  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 21  
 Asp Tyr Phe Lys  
       1

<210> 22  
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 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 22  
 Asp Gly Leu Tyr Asn Pro Lys  
       1                  5

<210> 23  
<211> 8  
<212> PRT  
<213> Sulfolobus solfataricus

<400> 23  
Asp Ile Asn Gly Ile Arg Glu Cys  
1 5

<210> 24  
<211> 7  
<212> PRT  
<213> Sulfolobus solfataricus

<400> 24  
Asp Phe Glu Asn Phe Glu Lys  
1 5

<210> 25  
<211> 7  
<212> PRT  
<213> Sulfolobus solfataricus

<400> 25  
Asp Leu Leu Arg Pro Asn Ile  
1 5

<210> 26  
<211> 5  
<212> PRT  
<213> Sulfolobus solfataricus

<400> 26  
Asp Ile Ile Glu Asn  
1 5

<210> 27  
<211> 7  
<212> PRT  
<213> Sulfolobus solfataricus

<400> 27  
Asp Asn Ile Glu Tyr Arg Gly  
1 5

<210> 28  
<211> 18  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Primer

<400> 28  
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18

<210> 29  
<211> 20  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence: Primer

<400> 29  
gataayatwg artayagrgg

20

<210> 30  
<211> 8  
<212> PRT  
<213> Sulfolobus solfataricus

<400> 30  
Arg Asn Pro Glu Ala Tyr Thr Lys  
1 5

<210> 31  
<211> 9  
<212> PRT  
<213> Sulfolobus solfataricus

<400> 31  
Asp His Val Phe Gln Glu Ser His Ser  
1 5

<210> 32  
<211> 8  
<212> PRT  
<213> Sulfolobus solfataricus

<400> 32  
Ile Thr Leu Asn Ala Thr Ser Thr  
1 5

<210> 33  
<211> 6  
<212> PRT  
<213> Sulfolobus solfataricus

<400> 33  
Ile Ile Ile Val Glu Lys  
1 5

<210> 34  
<211> 11

<212> PRT

<213> Sulfolobus solfataricus

<400> 34

Leu Gln Gln Tyr Met Pro Ala Val Tyr Ala Lys  
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<210> 35

<211> 5

<212> PRT

<213> Sulfolobus solfataricus

<400> 35

Asn Met Leu Glu Ser  
1 5

<210> 36

<211> 13

<212> PRT

<213> Sulfolobus solfataricus

<400> 36

Lys Ile Ser Pro Asp Gln Phe His Val Phe Asn Gln Lys  
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<210> 37

<211> 8

<212> PRT

<213> Sulfolobus solfataricus

<400> 37

Gln Leu Ala Glu Asp Phe Leu Lys  
1 5

<210> 38

<211> 10

<212> PRT

<213> Sulfolobus solfataricus

<400> 38

Lys Ile Leu Gly Phe Gln Glu Glu Leu Lys  
1 5 10

<210> 39

<211> 10

<212> PRT

<213> Sulfolobus solfataricus

<400> 39

Ile Ser Val Leu Ser Glu Phe Pro Glu Glu  
1 5 10

<210> 40  
 <211> 9  
 <212> PRT  
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<400> 40  
 Leu Lys Leu Glu Glu Gly Ala Ile Tyr  
 1 5

<210> 41  
 <211> 8  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 41  
 Glu Val Gln Ile Asn Glu Leu Pro  
 1 5

<210> 42  
 <211> 5  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 42  
 Asp His Ser Arg Ile  
 1 5

<210> 43  
 <211> 6  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 43  
 Asp Leu Arg Tyr Tyr Lys  
 1 5

<210> 44  
 <211> 14  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 44  
 Asp Val Tyr Arg Thr Tyr Ala Asn Gln Ile Val Lys Glu Cys  
 1 5 10

<210> 45  
 <211> 10  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 45  
 Thr Phe Ala Tyr Lys Ile Asp Gly Asn Glu  
 1 5 10

<210> 46  
 <211> 7  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 46  
 Leu Gly Pro Tyr Phe Ser Gln  
 1 5

<210> 47  
 <211> 7  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 47  
 Asp Val Phe Val Tyr Asp Gly  
 1 5

<210> 48  
 <211> 19  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 48  
 Tyr Asn Arg Ile Val Ile Ala Glu Ser Asp Leu Asn Asp Pro Arg Val  
 1 5 10 15

Val Asn Pro

<210> 49  
 <211> 5  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 49  
 Leu Asp Tyr Leu Lys  
 1 5

<210> 50  
 <211> 17  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 50  
 Lys Arg Glu Ile Pro Asp Pro Ala Ser Arg Tyr Gln Pro Leu Gly Val  
 1 5 10 15

His



<210> 51  
 <211> 9  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 51  
 Lys Asp Val Phe Val Tyr Asp Gly Lys  
   1                  5

<210> 52  
 <211> 9  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 52  
 His Ile Leu Gln Glu Ile Ala Glu Lys  
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<210> 53  
 <211> 10  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 53  
 Lys Leu Trp Ala Pro Tyr Val Asn Ser Val  
   1                  5                  10

<210> 54  
 <211> 7  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 54  
 Met Phe Ser Phe Gly Gly Asn  
   1                  5

<210> 55  
 <211> 14  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 55  
 Asp Tyr Tyr Tyr Gln Asp Phe Gly Arg Ile Glu Asp Ile Glu  
   1                  5                  10

<210> 56  
 <211> 7  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 56  
 Lys Ile Asp Ala Gln Trp Val  
   1                  5

<210> 57  
 <211> 18  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer

<400> 57  
 agcwagkagm taycarcc

18

<210> 58  
 <211> 24  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence: Primer

<400> 58  
 ytthccatcr tawacraawa catc

24

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 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 59  
 Asp Glu Phe Arg Glu Ser  
 1 5

<210> 60  
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 <212> PRT  
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<400> 60  
 Asp Asn Ile Glu Tyr Arg Gly  
 1 5

<210> 61  
 <211> 7  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 61  
 Pro Ala Ser Arg Tyr Gln Pro  
 1 5

<210> 62  
 <211> 8  
 <212> PRT  
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<400> 62  
 Asp Val Phe Val Tyr Asp Gly Lys  
 1 5

<210> 63  
 <211> 559  
 <212> PRT  
 <213> Sulfolobus solfataricus

<400> 63  
 Met Thr Phe Ala Tyr Lys Ile Asp Gly Asn Glu Val Ile Phe Thr Leu  
 1 5 10 15  
 Trp Ala Pro Tyr Gln Lys Ser Val Lys Leu Lys Val Leu Glu Lys Gly  
 20 25 30  
 Leu Tyr Glu Met Glu Arg Asp Glu Lys Gly Tyr Phe Thr Ile Thr Leu  
 35 40 45  
 Asn Asn Val Lys Val Arg Asp Arg Tyr Lys Tyr Val Leu Asp Asp Ala  
 50 55 60  
 Ser Glu Ile Pro Asp Pro Ala Ser Arg Tyr Gln Pro Glu Gly Val His  
 65 70 75 80  
 Gly Pro Ser Gln Ile Ile Gln Glu Ser Lys Glu Phe Asn Asn Glu Thr  
 85 90 95  
 Phe Leu Lys Lys Glu Asp Leu Ile Ile Tyr Glu Ile His Val Gly Thr  
 100 105 110  
 Phe Thr Pro Glu Gly Thr Phe Glu Gly Val Ile Arg Lys Leu Asp Tyr  
 115 120 125  
 Leu Lys Asp Leu Gly Ile Thr Ala Ile Glu Ile Met Pro Ile Ala Gln  
 130 135 140  
 Phe Pro Gly Lys Arg Asp Trp Gly Tyr Asp Gly Val Tyr Leu Tyr Ala  
 145 150 155 160  
 Val Gln Asn Ser Tyr Gly Gly Pro Glu Gly Phe Arg Lys Leu Val Asp  
 165 170 175  
 Glu Ala His Lys Lys Gly Leu Gly Val Ile Leu Asp Val Val Tyr Asn  
 180 185 190  
 His Val Gly Pro Glu Gly Asn Tyr Met Val Lys Leu Gly Pro Tyr Phe  
 195 200 205  
 Ser Gln Lys Tyr Lys Thr Pro Trp Gly Leu Thr Phe Asn Phe Asp Asp  
 210 215 220

Ala Glu Ser Asp Glu Val Arg Lys Phe Ile Leu Glu Asn Val Glu Tyr  
 225 230 235 240  
 Trp Ile Lys Glu Tyr Asn Val Asp Gly Phe Arg Leu Asp Ala Val His  
 245 250 255  
 Ala Ile Ile Asp Thr Ser Pro Lys His Ile Leu Glu Glu Ile Ala Asp  
 260 265 270  
 Val Val His Lys Tyr Asn Arg Ile Val Ile Ala Glu Ser Asp Leu Asn  
 275 280 285  
 Asp Pro Arg Val Val Asn Pro Lys Glu Lys Cys Gly Tyr Asn Ile Asp  
 290 295 300  
 Ala Gln Trp Val Asp Asp Phe His His Ser Ile His Ala Tyr Leu Thr  
 305 310 315 320  
 Gly Glu Arg Gln Gly Tyr Tyr Thr Asp Phe Gly Asn Leu Asp Asp Ile  
 325 330 335  
 Val Lys Ser Tyr Lys Asp Val Phe Val Tyr Asp Gly Lys Tyr Ser Asn  
 340 345 350  
 Phe Arg Arg Lys Thr His Gly Glu Pro Val Gly Glu Leu Asp Gly Cys  
 355 360 365  
 Asn Phe Val Val Tyr Ile Gln Asn His Asp Gln Val Gly Asn Arg Gly  
 370 375 380  
 Lys Gly Glu Arg Ile Ile Lys Leu Val Asp Arg Glu Ser Tyr Lys Ile  
 385 390 395 400  
 Ala Ala Ala Leu Tyr Leu Leu Ser Pro Tyr Ile Pro Met Ile Phe Met  
 405 410 415  
 Gly Glu Glu Tyr Gly Glu Glu Asn Pro Phe Tyr Phe Phe Ser Asp Phe  
 420 425 430  
 Ser Asp Ser Lys Leu Ile Gln Gly Val Arg Glu Gly Arg Lys Lys Glu  
 435 440 445  
 Asn Gly Gln Asp Thr Asp Pro Gln Asp Glu Ser Thr Phe Asn Ala Ser  
 450 455 460  
 Lys Leu Ser Trp Lys Ile Asp Glu Glu Ile Phe Ser Phe Tyr Lys Ile  
 465 470 475 480  
 Leu Ile Lys Met Arg Lys Glu Leu Ser Ile Ala Cys Asp Arg Arg Val  
 485 490 495  
 Asn Val Val Asn Gly Glu Asn Trp Leu Ile Ile Lys Gly Arg Glu Tyr  
 500 505 510  
 Phe Ser Leu Tyr Val Phe Ser Lys Ser Ser Ile Glu Val Lys Tyr Ser  
 515 520 525

Gly	Thr	Leu	Leu	Leu	Ser	Ser	Asn	Asn	Ser	Phe	Pro	Gln	His	Ile	Glu
530						535					540				

Glu	Gly	Lys	Tyr	Glu	Phe	Asp	Lys	Gly	Phe	Ala	Leu	Tyr	Lys	Leu
545					550					555				